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# Declining situation of Japanese forestry today and its challenges toward the 21st Century

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# Declining situation of Japanese forestry today and its challenges toward the 21st Century

Ikuo OTA

## 大田伊久雄「混迷する日本林業の現況と21世紀へ向けた取り組み」

日本林業は1960年代後半から70年代前半にかけて木材生産量のピークを迎えた後、外材輸入の波に押されて縮小の一途をたどっている。戦後の経済成長と歩調を合わせるように進められた拡大造林政策により、スギ・ヒノキを中心とする人工林資源基盤は充実しており、昨今では年間1億 $\text{m}^3$ 近い森林蓄積量の増加をみている。しかし、このうち木材として利用されるのは2,200万 $\text{m}^3$ 程度でしかなく、逆にその4倍もの木材資源を輸入しているのが実態である。木材価格の低迷を受けて国内林業は危機的な状況にあり、林家の林業離れも進んでいる。さらに、農山村における過疎化の進行は、林業労働力の減少という形においても影を落としている。特に東北・中国・四国・九州といった林業の盛んな地方において過疎化に歯止めがかからない現状には、林業の将来を考えるうえで憂慮すべきものがある。そうした中で、森林組合を中心とした若手林業労働者の新規参入・育成事業が一定の成果を見せていることは明るい材料であり、政府も1996年に「林業労働力の確保の促進に関する法律」を制定し、雇用機関への補助や機械化の推進を支援している。国有林野事業においては、1970年代半ばから特別会計制度が赤字を計上するようになり、1998年時点で3兆8,000億円という累積債務を抱えた。数次にわたる経営改善事業を経た後も状況は悪化する一方で、ついに1998年10月、林野庁は国有林野事業における独立採算制度を改めるとともに、抜本的な組織改革を行った。管理組織の統合と名称変更、人員のさらなる整理、公益的機能を重視した国有林利用区分への変更等、表面的には相当大きな改革であるが、その実効性にかんしては今後の推移を見守る必要があろう。また、政府は1991年に流域管理システムという地域林業の新たな方向性を打ち出した。林地の所有形態を越え、川上から川下までの総ての関連産業を流域単位で包含するという産地づくりを目指すこの考え方は、わが国林業の21世紀に向けた生き残り政策と位置付けることができる。国有林における施業の民間への委託や森林組合を中心とした労働力確保対策、これまでは別々に策定されていた国有林と民有林の森林計画をリンクさせることなど、流域管理システムの実現に向けた活動は少しずつではあるが進行している。しかし、日本林業にとって最も根本的な問題は自由貿易という国際的な動きの中で比較優位性を持たない部門がどのように存続できるかということである。わが国にとって森林が国土保全や水源涵養などの環境機能を発揮する重要な存在である以上、これを守り育てるためには山村に人が住み林業を含む諸活動が続けることが不可欠であろう。そのためには、国家政策として林業に対する保護的な貿易政策が必要となってくるのではないだろうか。

## 1. Introduction

Japan is one of the most heavily forested countries in the world. Twenty five million hectares out of 38 million hectares, or 66%, of total land area is covered by closed forest. It was natural that forestry became an established primary industry which supports rural economy as well as agriculture during its history of economic development. However, forest production has been declining since mid 1970's, and forestry is no more a major industry in many of rural mountainous towns and villages today.

Table-1 shows figures of forest area and forest production in four European forest production countries and Japan in 1995. Forest area in Japan is smaller than that in Sweden, but a little bigger than Finland, and much bigger than France and

Table-1 Comparison of forest area and forest production in some European countries and Japan (1995).

		Sweden	Finland	France	Germany	Japan
Land Area	(Mha)	41,159	30,461	55,010	34,927	37,652
Forest Area	(Mha)	28,015	23,373	14,154	10,735	24,718
Rate of Forest Cover	(%)	68.1	76.7	25.7	30.7	65.6
Wood Fiber Production	(Mm <sup>3</sup> )	63,600	49,894	43,361	39,005	25,834
Firewood & Charcoal	(Mm <sup>3</sup> )	3,800	4,095	9,800	3,795	138
Woodchip	(Mm <sup>3</sup> )	24,600	22,968	11,414	13,104	7,497
Sawnwood & Others	(Mm <sup>3</sup> )	35,200	22,831	22,147	22,106	18,199
Softwood	(Mm <sup>3</sup> )	58,100	41,459	23,758	27,184	18,887
Hardwood	(Mm <sup>3</sup> )	5,500	8,435	19,603	11,721	6,947
Rate of Self Sufficiency in Sawnwood	(%)	100+	100+	84	80	34

Source : World Resources Institute, UN Environmental Programme, UN Development Programme, The World Bank. 1998. 1998-99 World Resources., FAO. 1995. State of the World's Forests., and FAO. 1998. Forest Products 1996.

Germany. However, volume of forest production in Japan is smaller than all of these four European countries. We have a lot of forest resources growing domestically, but produce only a limited volume of its allowable cut volume in recent years. Rate of self sufficiency in sawnwood is only 34%, and it is very low to compare with other countries.

This paper aims to describe present state of Japanese forestry, and to analyze its problems and future perspectives. First, general trend of timber production and forest resources in Japan from 1960's is mentioned. The effect of imported timber is also pointed out. Secondly, problems caused by depopulation of rural areas and decrease of forest workers are described. Then, details of recent reorganization of national forest is explained. Lastly, the River Basin Forest Management System as an aggressive plan to provide and realize domestic timber era is described.<sup>1)</sup>

## 2. Present state of Japanese forestry

### 1) Recent trend in forestry production

In the long history of forestry in Japan, 1960's was the remarkable period for its rapid expansion. Forestry and forest industry were money making businesses at that time. Under the growing economy after the World War II, demand for wood largely exceeded supply, and the price of timber erupted. Government decided to operate urgent raw log import programs in early 1960's, and timber market gradu-

ally became almost free trade situation from that time on. Trading companies made efforts to import logs from United States, the Philippines, Indonesia, Malaysia, USSR, and many other forest producing countries with having some governmental supports. Sawmills also enlarged their production capacity by shifting materials from small domestic logs to large imported logs.

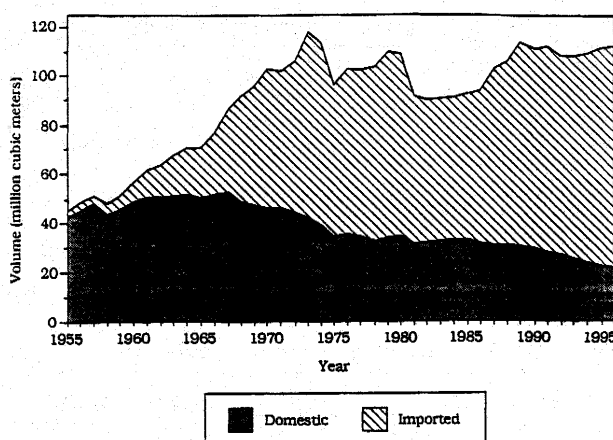


Figure-1 Trend of wood supply source to Japan (1955-1996).

Source: Forestry Agency. Each year. Table of wood demand and supply.

With the cumulative effect of policy change and economic circumstances, domestic forest production gradually decreased year by year.

Figure-1 shows the trend of domestic and imported timber supply in Japan. It is easy to understand what is going on in domestic forestry sector from this figure : Production is constantly shrinking. This is not caused by the depletion of forest resources, but by the economic less competitiveness in domestic forestry.

As a result of the continuing governmental effort for contributing international free trade economic order, forest products prices in Japanese market have been very stable, or they rather have been shifting down. That is of course good for consumers, but never to domestic producers. Forestry White Paper for Fiscal Year 1997 displayed the downward trend of the real price of sawntimber, log, and stumpage : Within the period from 1969 to 1996, sawntimber price of Sugi (Japanese Cedar : *Cryptomeria japonica*) dropped 6 percent, log price dropped 33 percent, and stumpage price dropped 55 percent. The situation is critical for forestland owners both private and public.

## 2 ) Import of wood

Japan imports raw logs, sawntimber, plywood, wood chips, and other forest products from many different countries. While import of sawnwood and other value-added products such as laminated lumber is increasing, raw log import is decreasing with the exception of those from Russia. The volume of imported wood is not always increasing during recent years, but because of domestic production has

**Table-2** Trend of timber production volume by ownership in Japan (1967, 1977, 1987, and 1997).

Ownership	1967	1977	1987	1997
(Thousand m <sup>3</sup> )				
National	14,180 (27.4%)	11,938 (35.3%)	9,228 (29.9%)	4,345 (20.2%)
Municipal	2,797 (5.4%)	2,191 (6.5%)	1,769 (5.7%)	1,312 (6.1%)
Private	34,836 (67.2%)	19,664 (58.2%)	19,896 (64.4%)	15,894 (73.8%)
Total	51,813 (100%)	33,793 (100%)	30,893 (100%)	21,551 (100%)

Source: Forestry Agency. Each year. Summary of Forestry Statistics.

**Table-3** Forest area and timber inventory by ownership in Japan (1997).

Ownership	Forest area (Thousand ha)	Timber inventory	
		Plantation forest (Million m <sup>3</sup> )	Natural forest (Million m <sup>3</sup> )
National	7,844 (31.2%)	292.2 (15.4%)	618.7 (38.9%)
Municipal	2,730 (10.9%)	198.6 (10.5%)	160.4 (10.1%)
Private	14,572 (57.9%)	1,401.2 (74.1%)	810.9 (51.0%)
Total	25,146 (100%)	1,892.0 (100%)	1,590.0 (100%)

Source: Forestry Agency. 1999. Summary of Forestry Statistics.

been decreasing, self sufficient rate of wood in Japan is also decreasing.

United States is the largest supplier of wood to Japan, and total volume of wood from US is 25.3 million cubic meters in roundwood equivalent, and this figure is bigger than those of Japanese domestic production. Raw log, sawntimber, and wood chips are the major items traded from US. Canada (sawntimber), Russia (raw logs), Malaysia (raw logs), Indonesia (plywood), and Australia (wood chips) are the other major contributors.

### 3) Production by different ownership

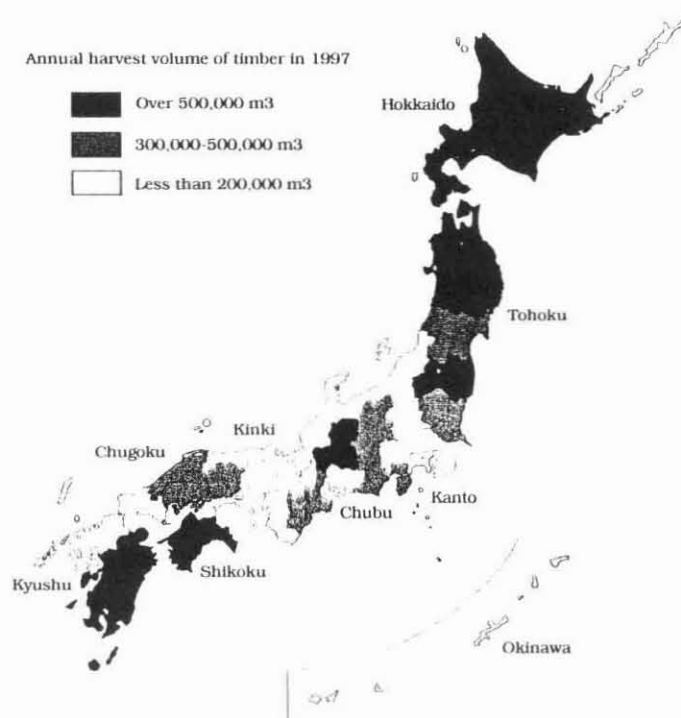
Forestry and forest industry in Japan is facing a very severe recession from 1997, while general situation around forestry has been getting worse since middle of 1970's. Domestic timber production has been decreasing in this thirty years: It was 51.8 million cubic meters in 1967 at the largest, but was 21.5 million in 1997 as shown in Table-2. Private forests occupy 57.9 percent of total forest land, and it has been playing the major role in Japanese forest sector today. In 1997, 15.9 million cubic meters or 73.8% of total domestic timber production was from private forests as shown in the Table.

National forest is another major player, but it has been shrinking its production rapidly. It produced more than 35% of domestic timber in 1970's, but it shrank

into 20% recent years. The role of private forest is getting more bigger in the near future. National forest keeps a lot more portion of natural forest than private forest. As shown in Table-3, timber inventory in artificial plantation forest in national forest is only 15%, and those in private forest is 74% in total. On the other hand, timber inventory in natural forest in national forest is 39%, and those in private forest is 51%. This prevails that many of economically productive forests are located in private forestlands.

#### 4) Regional characteristics of timber production

Figure-2 shows the distribution of timber production areas in Japan. Hokkaido is the most productive prefecture and it produced 4,635,000m<sup>3</sup> or 21.5% of total timber production in 1997. Other productive prefectures are located in Tohoku, Chubu, Shikoku, and Southern Kyushu regions. Table-4 shows major timber production prefectures by species in 1997. The main commercial species in Hokkaido are Ezomatsu (Yezo Spruce: *Picea jezoensis*), Todomatsu (Saghalien Fir: *Abies*



**Figure-2** Distribution of timber production areas in Japan.  
Source: Forestry Agency. 1999. Summary of Forestry Statistics.

**Table-4** Major timber production prefectures by species (1997).

Species	First	Second	Third
	(Thousand m³)		
Japanese Cedar	Miyazaki (1,024)	Akita (683)	Oita (663)
Japanese Cypress	Gifu (228)	Kochi (219)	Mie (213)
Pine	Iwate (198)	Hiroshima (198)	Fukushima (175)
Other softwood	Hokkaido (3,264)	Aomori (166)	Iwate (165)
Hardwood	Hokkaido (1,306)	Iwate (553)	Fukushima (247)
Total	Hokkaido (4,635)	Miyazaki (1,300)	Iwate (1,273)

Source: Forestry Agency. 1999. Summary of Forestry Statistics.

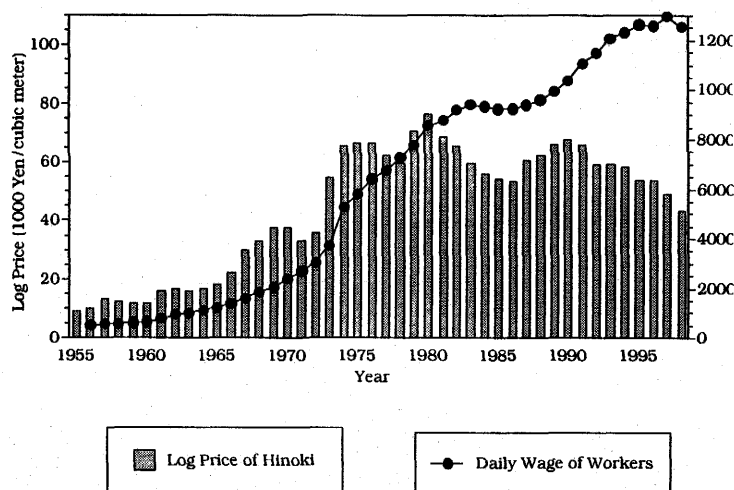
*schalienensis*), and hardwood species like oak and beech.

Miyazaki in Southern Kyushu region is the largest Sugi producing prefecture, and Oita, next to Miyazaki, is the third. This area is very good for growing Sugi fast because of its hot and humid climate, and most of the timber harvested are from man-made forests planted after the World War II. Rotation age is about 35 to 40 years there. On the other hand, Akita, the second largest Sugi producing prefecture, is located Tohoku region, and they have been producing high quality natural trees for long time. Rotation age there is much longer than Kyushu region.

For Hinoki (Japanese Cypress : *Chamaecyparis Obtusa*), Gifu in Chubu region is the largest, and surrounded prefectures such as Mie, Shizuoka, Nagano, and Aichi are structuring productive area. Shikoku region, especially Kochi and Ehime, is the other productive area of Hinoki. For pinus species, mainly Akamatsu (Japanese Red Pine : *Pinus densiflora*), Tohoku region, such as Iwate and Fukushima, and Chugoku region, especially Hiroshima and Shimane, are the two main productive areas.

## 5 ) Timber price and wage

Figure-3 shows the changing patterns of forestry workers' daily wage and Hinoki raw log price. Until mid 1970's, both wage and log price increased at the similar rate. It is more



**Figure-3** Trend of log price of Hinoki and daily wage of forestry workers (1955-1998).

Source: Ministry of Agriculture, Forestry and Fishery. Each year. Report of Wood Demand and Supply, and Ministry of Labor. Each year. Report for the Wage of Forestry Labors in Category.

clearly understood by using simple statistical calculation. Between 1956 to 1975, wage and Hinoki price have strong positive relationship: When Hinoki price rises 1,000 Yen per cubic meter, then wage increases 85.8 Yen per day. Adjusted  $R^2$  of this regression is 0.950,

and all the estimated parameters are significant at 99% confidence interval.<sup>2)</sup>

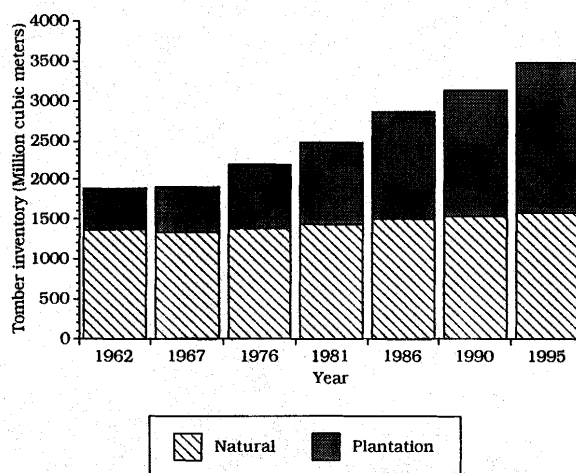
However, after that, while wage continued to increase, Hinoki raw log price did not go up. Positive relationship between two variables had completely disappeared. Instead, using the data between 1976 to 1998, wage and Hinoki price have some negative relationship.<sup>3)</sup> It is hard to rationalize this result. There must be other variables which explain this situation more accurately.

This tendency means that it has been becoming harder and harder for forestland owners to continue their forestry activities. While cost increased, sales did not increase, and real income for owners decreased.

## 6 ) Steadily growing timber inventory

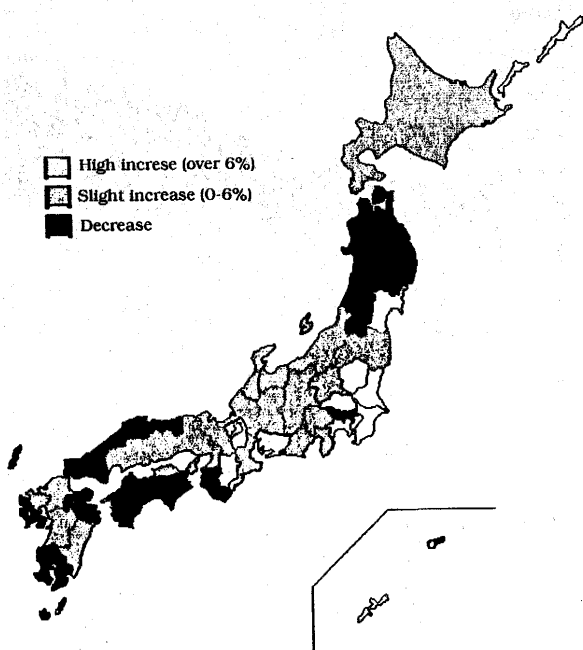
While the profitability of forestry has been going down, timber inventory in Japan has been steadily increasing in this four decades. Figure-4 shows the trend of timber inventory in Japan. Stock in natural forest has been very stable, but those in plantation forest has been constantly increasing. Presently, there are ten million hectares of artificial plantation forest in Japan, and this composes over 40% of total forestland. Annual increment of wood fiber is about 100 million cubic meter. On the other hand, annual harvest of timber is less than one fourth of its increment, and national forest inventory is constantly increasing more than 70 million cubic meters per year.

Forest resources are increasing almost as planned, but utilization of these timber is not in good shape. There are several reasons which brought about this difficult situation : Decrease of timber prices caused by imported products, increase of cost, improvement of engineered wood, changing housing construction methods, economic recession and so on.



**Figure-4** Trend of timber inventory in Japan (1962-1995).  
Source: Forestry Agency. Each year.  
Summary of Forestry Statistics.





**Figure-5** Population change of municipalities in Japan from 1985 to 1995.  
Source: Statistic Bureau. 1997. An overview of population of Japan

### 3. Depopulation of rural area and decrease of forestry workers

#### 1) Depopulation problems

Depopulation is one of the most critical problems in many part of rural areas in Japan. Young people are going to take opportunities to live in convenient urban areas after graduating school, and their parents and grandparents will stay in rural villages without the younger generation. Problems of so-

cial welfare for aged people are concerned in many part of the nation. The main cause of population decrease is still social decrease (moving of people), but in some prefectures, such as Kochi and Akita, natural decrease (number of death exceeds that of birth) is happening.

Figure-5 shows population change of prefectures during a decade from 1985. Dark shaded areas are prefectures where population decreased in this ten years. Population is decreasing in more than half prefectures in northeast (Hokkaido and Tohoku) and southwest (Chugoku, Shikoku, and Kyushu) regions. Many of productive forestry areas which we saw in Figure-2 are included in these parts of the nation. Average annual population growth in Japan from 1990 to 1995 was 0.31%, that means total population is very stable, but the differentiation of population density is still going on today.

Table-5 shows the trend of population and population density in urban municipalities (Cities) and rural municipalities (Towns and Villages). Number of the people living in cities has been increasing steadily, but that in towns and villages has been decreasing. In 1995, 78.1% of Japanese people were living in 665 Cities, and 21.8% were in 2,568 Towns and Villages, while the land area of Cities occupied

**Table-5** Trend of population and population density in urban area (Cities) and rural area (Towns and Villages) from 1955 to 1995.

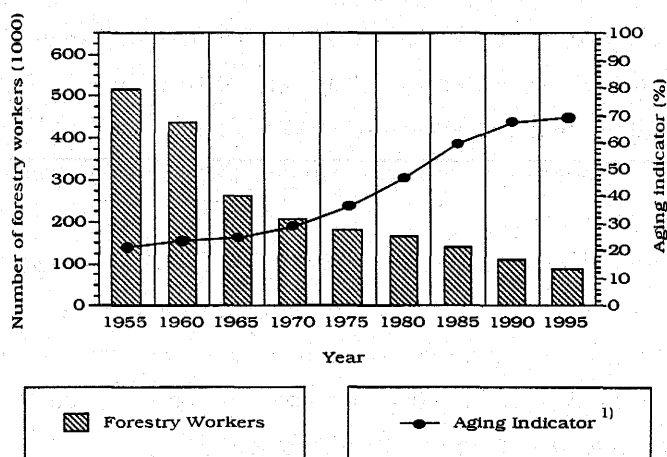
	Population(1000)				Population density (persons/km <sup>2</sup> )	
	Cities	(%)	Towns & Villages (%)		Cities	Towns & Villages
1955	50,532	56.1	39,544	43.9	743	131
1960	59,678	63.3	34,622	36.7	721	120
1965	67,356	67.9	31,853	32.1	761	113
1970	75,429	72.1	29,237	27.9	792	106
1975	84,967	75.9	26,972	24.1	831	100
1980	89,187	76.2	27,873	23.8	870	104
1985	92,889	76.7	28,160	23.3	902	105
1990	95,644	77.4	27,968	22.6	922	105
1995	98,009	78.1	27,561	21.9	934	103

Source Statistic Bureau. 1997. An overview of population of Japan.

only 27.8% and that of Towns and Villages were 71.8%. Population density in Cities are nine times as high as that in Towns and Villages as shown in the table. Among the total of 3,233 municipalities, 1,199 are designated as depopulated municipalities by the government. Land area of these depopulated municipalities are 17.9 million hectares or 47.2% of total surface area. Population decrease in remote mountainous areas strongly affects the regional forestry activities.

## 2) Decreasing forestry workers

Decline of domestic forestry is reflected by constant decrease of forestry workers. As shown in Figure-6, the number of forestry workers in 1995 was 86 thousand, which was only one sixth of that in 1955. On the contrary, aging indicator, which is the ratio of aged (over fifty years old) workers, increased in this 40 years. The number of forestry workers dwindle



1) Aging indicator is the ratio of workers over fifty years old within total number.

**Figure-6** Trend of the number of forestry workers and the aging indicator in Japan (1955-1995).

Source: Statistics Bureau. 1955 to 1995. Population census of Japan.

dled rapidly until 1970, and aging indicator increased rapidly after 1970. In Northern European countries such as Sweden and Finland, recent decrease of forestry workers means the progress in mechanization and the increase of productivity, but in Japan, it just means dwindling of forestry.

Before the first oil shock in 1973, economy in Japan enjoyed continuous high growth, and many forestry workers, both young and aged, were able to get the other good jobs easily when they went to urban market. Therefore, even the number of workers decreased, aging indicator did not change a lot. However, after the mid 1970s, with the change of national economic situation, it was not easy to get good jobs in urban areas for aged workers, and only young forestry workers and potential forest workers could be go out from rural area. Then, the total number of forestry workers decreased slowly, while the aging indicator increased rapidly. The aging indicator in 1995 was 69.0%, and the average age of forestry workers was just about sixty years old today.

### 3) Counter-activities of forestry cooperatives

Nationwide forestry cooperatives system was established by the Forestry Act of 1951, and renewed by the Forestry Cooperatives Act of 1978. Two main objectives of forestry cooperatives are, (1) to raise socioeconomic status of forestry owners, and (2) to increase productivity of timber with facilitating healthy forests. There are about 1,300 forestry cooperatives all over the nation, and 50 percent of private forest owners or 73 percent of total private forestlands are composing this forestry cooperatives system (excluding prefectural forests) today. Workers in forestry cooperatives also are playing the major role in silvicultural practices in private forestland.

Number of forestry workers employed by forestry cooperatives has been decreasing as a result of dwindling of domestic forestry. Decreasing trend is similar to that in total number of forestry workers shown in Figure-6. From 1980 to 1995, total number of forestry workers in Japan dropped 48.1%, and that in forestry cooperatives from 1980 to 1996 dropped 48.7%.

Table-6 shows the trend of the number of forestry workers in forestry cooperatives by age class. In total, number of workers is decreasing. However, observing the trend of change in each age class, we can find several interesting facts. A big decrease happened in the age class of 40-49 and 50-59. Rate of decrease in this 16 years was 78.6% and 66.3% respectively.

**Table-6** Trend of the number of forestry workers in forestrycooperative system by age class (1980, 1986, 1992, 1996).

Age Class	1980	1986	1992	1996
-19	126	} 1, 113	588	1, 087
20-29	} 7, 496			
30-39				
40-49				
50-59	18, 477	10, 183	4, 359	3, 960
60-	22, 120	22, 140	11, 782	7, 445
	10, 630	13, 806	15, 864	16, 091
Total	58, 849	51, 495	34, 406	30, 208

Source: Federation of Forestry Cooperatives. 1980, 1986, 1992, and 1996. Statistics of Forestry Cooperatives.

On the other hand, workers in the age class of over 60 years old is increasing : It increased 51.4% in the same period. This means that retiring age is becoming older, for which two possible reasons can be thought. One is the improvement of working environment, such as higher road density and mechanization. The other is the lack of workforce. Many forestry cooperatives depends deeply on aged workers, and they cannot retire unless substitute workers come in. This is the reason that aging indicator still tends to be higher today.

Another fact is the trend in younger workers. Focusing the age class of under 29 years old, number of workers had been decreasing until early 1990s, but it turned to increase after that. From 1992 to 1996, the number in this youngest age class doubled ; from 588 to 1,087. Even the absolute number is not so big, this change of direction has a big meaning for Japanese forestry. It is the result of efforts of many forestry cooperatives for recruiting young people as forestry workers. It also suggests us that young people's recognition of forestry has changed for the better.

Monthly salary, improvement of work environment, lifetime employment status, appropriate insurance and benefit, and well prepared recruitment activity are the common features of successful organizations for getting young workers.<sup>4)</sup> Promotion for Securing Forestry Workers Act, which passed the Diet in 1996, enabled to support forestry cooperatives and other private companies for recruiting and training forestry workers. In many prefectures, forestry cooperatives began to use this subsidy for securing young workers since then. This policy is one of the promising public support systems for revitalizing Japanese forestry.

## 4. Failure of National Forest management

### 1) Outline of National Forest in Japan

National Forest is the biggest single forestry enterprise in Japan. Designated land area as National Forest is 7,650,000 hectares or 30.4% of total forestland. Forestry Agency in the Ministry of Agriculture, Forestry, and Fishery is managing the whole system. Distribution of National Forests is concentrated in northern part of the nation, that is mainly because of historical reasons. There are 3,090,000 hectares of National Forest in Hokkaido Region, and 2,070,000 hectares in Tohoku Region.

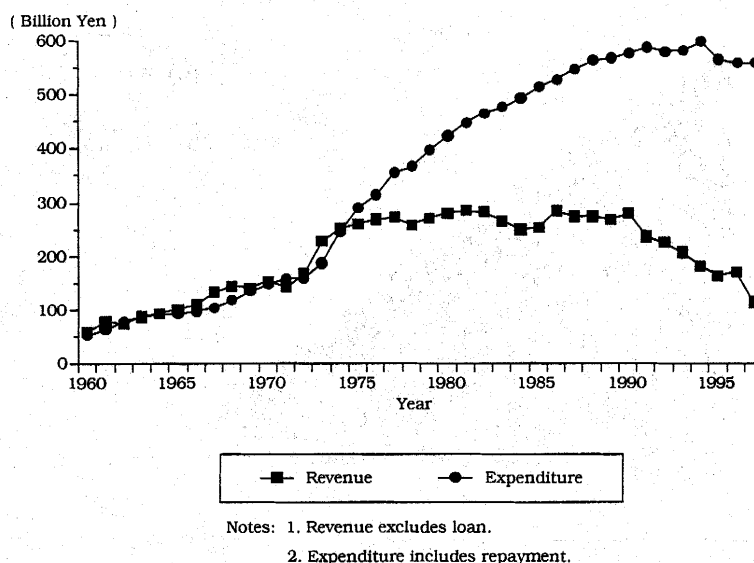
National Forest has been playing important roles in the following three aspects :

- (1) Public benefit function of the forests,
- (2) sustainable supply of various forest products, and
- (3) contribution to local economy.

During most of the period after the World War II, timber production was the first objective for the management of National Forest. Since early 1970's, timber production volume from National Forest has been decreasing gradually as shown before. In 1965, National Forest produced 15.8 million cubic meters of timber, and it was 31.9% of total domestic timber production. However, in 1997, National Forest produced only 4.3 million cubic meters of timber, and it was 20.2% of total domestic timber production. Timber production level of National Forest decreased into one forth in this 30 years, and its share also shrank remarkably. This means timber production is no more the primarily important objective for the management of National Forest presently.

### 2) Unique accounting system and betterment plans

Special Accounts System had introduced into National Forest in 1947, and efficient forest management has been pursued under this business oriented self-supporting accounting system. It was going well in the first two decades and National Forest used to be a profit making system. However the situation around domestic forestry and National Forest changed rapidly during mid 1970's. Increasing supply of imported log and timber defeated high cost domestic forestry products. Special

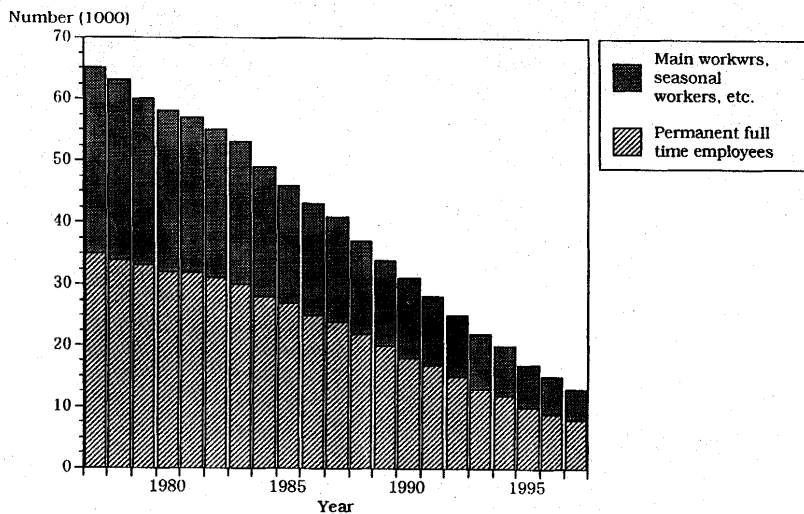


**Figure-7** Trend of revenue and expenditure of National Forest Account (1960-1997).  
Source: Forestry Agency. 1999. Summary of Forestry Statistics.

Accounts System of National Forest went into the red, and cumulative deficit has been steadily increasing since 1975. Figure-7 shows trend of revenue and expenditure of National Forest Account from 1960 to 1997. The gap between cost and revenue has been becoming wider and wider.

Under such financial condition, National Forest administration of Forestry Agency tried to modify their management system. They made a Plan for Betterment of National Forest Management in 1978. In this plan, they aimed to balance the account until 1997 by introducing efficient management system into forestry practices and office works, and reducing employees (mainly forest workers). With the situation going bad from worse, Forestry Agency revised the betterment plan three times ; in 1984, 1987, and 1991.

What they tried to do was to increase efficiency of the total management system. They cut production volume on forests which did not pay well, used less expensive outside laborer for silicultural practices and logging, and decreased expenditure by means of reducing the number of managerial offices and employees. Three hundred and fifty one District Forest Offices and 65,000 employees were managing 7.6 million hectares of National Forest in 1978, while there were 229 District Forest Offices and 14,000 employees for managing the same forestland area in 1997 as shown in Figure-8.



**Figure-8** Trend of the number of employees in National Forest in Japan: 1977-1997.  
Source: Forestry Agency. 1998. Status of the Betterment of National Forest Management: Fiscal Year 1997.

**Table-7** Trend of the timber production volume by self employed and commissioned workers: 1978-1997.

Year		1978	1982	1986	1990	1994	1997
Commission	(1000m <sup>3</sup> )	1,200	1,400	1,600	1,500	1,500	900
Self Employed	(1000m <sup>3</sup> )	3,800	3,800	3,000	2,000	1,000	400
Total	(1000m <sup>3</sup> )	5,000	5,200	4,600	3,500	2,500	1,300
Ratio of Commission	(%)	24	27	34	43	58	71

Source: Forestry Agency. 1998. Status of the Betterment of National Forest Management: Fiscal Year 1997.

### 3 ) Remaining problems

Forestry Agency has been employed forestry workers called "Main Workers", who are dealing with plantation, logging, and other silvicultural works. The agency is going to transfer such works to commissioned companies and to abolish the system of Main Workers. Table-7 shows the trend of the timber production volume by self employed and commissioned workers. The agency has already promoted the transfer in this 20 years and the ratio of commission within total timber production is above 70% presently. In addition, the total volume of timber production sales is going down rapidly while stumpage sales is rather constant. Reduction of the number of forestry workers would be one of the largest cost lowering strategies for Forestry Agency, and it is on going steadily.

However, such continuous efforts had not been rewarded in the end, and radical reorganization of the total National Forest management system had to be in-

## 5. National Forest reorganization

### 1) Reorganization of National Forest management system in 1998

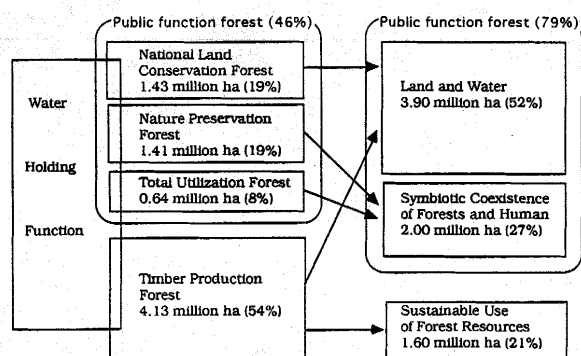
After the final report of the Forestry Administration Council, which was requested to create a reorganization plan by the Minister of Agriculture, Forestry, and Fishery, central government introduced an epoch making reform of National Forest management system. The following two new acts were enforced in October 1998.

Act of Special Measures for National Forest reorganization was to explain the reasons of this reorganization, to declare the new objectives of National Forest management, and to designate a number of special measures. This act declared that the main objective of managing National Forest should be changed from continuous timber production into pursuing public benefit function. It also said to abolish self-supporting accounting system of National Forest, and to transfer 2.8 trillion Yen of cumulative debt out of 3.8 trillion in total into general account budget for repaying.

Act of Preparation of Related Laws for National Forest reorganization was to amend National Forest Act, National Forest Special Account System Act, and several other acts in harmony with the reorganization of the system.

Noteworthy points of this reorganization are summarized as follows :

- (1) The primary importance of National Forest management should be changed from timber production function into public benefit function,
- (2) abolishment of forestry practices with using National Forest employees and facilitating entire com-



**Figure-9** Transformation of forest use classification for National Forest in Japan.

Source: Forestry Agency. 1998. Status of the Betterment of National Forest Management: Fiscal Year 1997.



mission of such works to outside laborer,

- (3) integration of Regional Forest Offices from 14 (including 5 Branch Offices) to 7, and District Forest Offices from 229 to 98,
- (4) reformation of National Forest Special Accounting System,
- (5) making realistic schedule to repay 3.8 trillion Yen of cumulative debt, and
- (6) creating basic forest management plans having formal public review both in national and regional level.

With the conceptual change of National Forest management from timber production to environmental protection, drastic transformation of forest use classification has done. Figure-9 shows the rough sketch of forest use classification before and after the transformation. Biggest change is the expansion of public benefit function forest; total forestland area for such purpose becomes 5.90 million hectares (79% of National Forest) from 3.48 million hectares (46%) previously. On the other hand, forestland mainly for timber production shrinks from 4.13 million hectares (54%) to 1.60 million hectares (21%), and this obviously shows the decline of relative importance of timber production in National Forest.<sup>5)</sup>

## 2) Repaying cumulative debt

Cumulative debt problem surely was the biggest issue in National Forest before the reorganization. Making realistic schedule of repaying 3.8 trillion Yen of cumulative debt was critically necessary. In this plan, 2.8 trillion Yen of cumula-

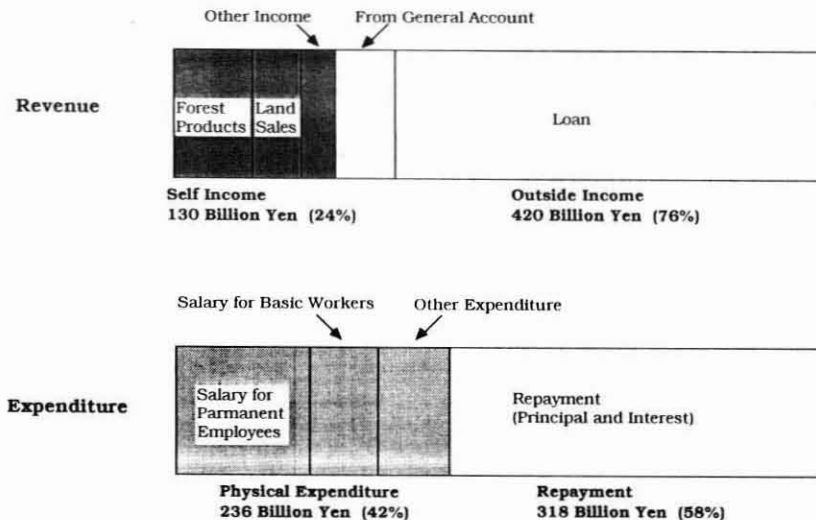


Figure-10 Details of revenue and expenditure of National Forest Account in 1997.  
Source: Forestry Agency. 1998. Status of the Betterment of National Forest Management: Fiscal Year 1997.

tive debt is going to be transferred into general account budget and will be repaid mainly by using tax money. The rest of 1.0 trillion Yen of debt will be repaid by National Forest Special Account in 50 years horizon, but additional interest during that period would be paid by general account budget for preventing another cumulative debt.

However, thinking about the present situation of National Forest accounting, it would be very hard to repay this 1.0 trillion Yen. Figure-10 shows details of revenue and expenditure of National Forest Special Account in 1997. In this figure, shaded area in revenue bar shows the self-income of National Forest activities, which was 130 billion Yen. On the other hand, shaded area in expenditure bar shows the costs for regular activities in this year, which was 236 billion Yen. Neglecting the repayment of previous debt, National Forest accounting is not able to avoid for making another deficit each year.

### **3 ) Positive evaluation of the reorganization**

Reorganization of National Forest can be well evaluated in certain aspects. First of all, to change the independent accounting system is what the most people desired to do. The amount of cumulative debt was extraordinarily big, but it was due to the specific system of anachronism, and many of us believed the problem was in the system itself but not in the growing debt. Under the Plan for Betterment of National Forest Management since 1978, Forestry Agency began to focus on the money not to the forest. They were so eager to cut the employees that they did not pay enough attention to grow good forests. For example, cultivated natural forest practice was one of the idea Forest Agency newly introduced, but this was criticized as corner-cutting forest practice by the cynical public. Because of the abolishment of self-supporting accounting system, National Forest is now free from a spell of repayment of interest.

It was also new for Japanese people that National Forest declared to be a forest for national public. National Forest had been behaved as national government's forest and not as national public forest since its beginning. That was why the revenue from timber production and other activities including disposal of the land was pursued regardless of public opinions. After the reorganization, formal public review process is introduced in the basic forest management plans. It must be a big step for the National Forest toward the forest for the people.

The change of the management objective from timber production to public

**Table-8** Result of opinion poles about expected forest functions.

Functions	1980	1986	1989	1993	1996
	------(%)-----				
Timber production	55.1	33.1	27.5	27.2	22.3
Forest by-products	18.4	12.3	11.3	9.7	10.2
Water	51.4	49.0	53.8	59.0	59.7
Land protection & flood prevention	61.5	70.1	68.1	64.5	68.9
Air purification & noise reduction	37.3	36.6	36.1	37.9	41.2
Recreation	27.2	25.4	15.2	13.6	12.2
Outdoor education	—	20.8	16.8	14.0	12.7
Wildlife	—	—	41.3	45.4	41.3

Source: Statistic Bureau. 1981, 1987, 1990, 1994, and 1997. Opinion Pole Almanac.

benefit function is also very important for the public. Table-8 shows the result of historical opinion poles about expected forest functions (multiple choices). It appeared that Japanese people tend to have more and more importance on public benefit function (Land protection & flood prevention, water, and air purification & noise reduction), and less importance on material production function (timber production and by-products). One can say that it would be a rational choice for Forestry Agency to change the main objective of National Forest management to public benefit, which is along the change of general public opinion.

#### 4) Anxieties about the reorganization

There also are some doubts about this reorganization. Is National Forest really able to repay their part of debt? Is National Forest kept good in health with such a small number of employees? Are rural societies that deeply depends on forestry and forest industry rewarded under the trend of shrinking timber production?

Creating jobs for rural forest workers and supplying timber to local mills could be the major roles of National Forest for regional economy. Expected average annual harvest volume under the reorganization is about 4.6 million cubic meters from 1999 to 2003, and 6.7 million cubic meters from 2004 to 2008. The latter is almost the same volume as in 1996 and 1997, but the former is 30% smaller than what they harvested recent years. It is questioned that this kind of halfhearted expectation would lead negative impact for regional forest sector.

Another argument is still going on about who take care of National Forest. In early 2000's, Japanese government make a big reorganization of public agency system, and Ministry of Environment will be established. Politicians, public officers,

and researchers are discussing whether whole or parts of National Forest would be included in the Ministry of Environment other than Ministry of Agriculture, Forestry, and Fishery. Famous World Natural Heritages such as Yaku Island presently is under the supervision of Forestry Agency, while some people are worrying the future of precious Natural Heritage because the Forestry Agency is still having big budgetary problems.

## **6. River Basin Forest Management System and the future of Japanese forestry**

### **1) River Basin Forest Management System**

To cope with the difficulties of domestic forestry, central government built a nationwide forestry and forest industry promotion plan in early 1990's. It would be critically important to build up efficient and constant timber supply system within each forestry region, and with the revision of Forestry Law in 1991, the government introduced the River Basin Forest Management System, which is a new idea of regional forest management.

Basic concept of its resource management is concluded in the following two points; (1) to enhance diverse forests for keeping natural ecosystem and water holding capacity, and (2) to prepare industrial conditions for coming "domestic forestry age". In the second objective, all the forestry related economic activities, i.e. timber production as a primary industry, sawmilling and processing as a secondary industry, and distribution and sales as a third industry, are included.

Government divided the forestry regions over Japan into 158 River Basins. All types of land ownerships, including National Forest, municipal forest, communal forest, and private forest, are automatically involved into this River Basin System, and their organic relationship is desired. Up until recent years, timber production plans of national forest and that of private land were not intimately related each other. Small sawmills, which still are the majority of Japanese forest production enterprises today, have been making individual effort to get raw materials for their daily production. Under the River Basin Forest Management System, all these landowners and enterprises are expected to get together under the supervision of River Basin Forestry Activity Center, which is legally designated organization for coordination in each River Basin.

## 2) Cooperation of private and public forests

Well planned timber production, promotion of higher mechanization, and recruiting and training forestry workers within the River Basin are the major tasks for the Activity Center. Forestry cooperatives, which are legally guaranteed forest landowners associations, will be one of the core organizations under the direction of Activity Centers in many of the 158 River Basins.

Also, in the New Basic Plan for National Forest Management, cooperation with private forestry sector in forest planning, road construction, and timber production is strongly recommended. Forest planning system in National Forest used to be separated with those in private forest, and both plans were not consistent with each other. Under the River Basin Forest Management System and the New Basic Plan for National Forest Management, however, National Forest has to change the attitude of independence in management and rather to adjust its plan to private forest, because private forestlands should be in the leading position at the most of regional forestry. It might be difficult for bureaucratic Forestry Agency to change their attitude quickly, but the challenge is beginning.

The idea of River Basin Forest Management System is an enthusiastic concept for revitalizing domestic forestry in 21st Century. It requests all types of the forestland owners to consider cooperative forest practices in the river basin. Forestry cooperatives are expected to play central role for it in many River Basins. National Forest officially admitted this idea within its forest plan as well. Cooperation of private forestry sector and public forestland including National Forest and other municipal forest must be the key to the success. Then, enough and constant supply of timber from the river basin will be achieved.

## 7. Conclusions

Some people outside the country say that Japanese are keeping their precious forests and consuming foreign forest resources. However, as described in this paper, we do not have such a policy at all. We rather have a big problem of over stocking and lack of appropriate silvicultural practices for artificial plantation forests. Forest resources are vigorously growing, but production is constantly going down and most of the forests are not managed well because of reduction of the revenue of owners. It is such a strange situation, but is a reality.

In this paper, present declining situation of Japanese forestry from the aspect of rural depopulation and reorganization of National Forest are mentioned. Many other problems, such as high cost of plantation and logging, or inefficiency and less profitability of sawmill industry, are exist around Japanese forestry today. Forestry in Japan is undoubtedly in an endangered situation.

Free trade economic system may benefit people by trading most of the industrial products or services, but must not for area specific primary products like agriculture and forestry. Even though we have 100 million cubic meters of wood fiber demand each year, low price of timber which lead by imported forest products becomes an obstacle for sound development of domestic forestry. Promotion strategy like River Basin Forest Management System is necessary and important, but some sort of policy change in forest products trade might be desired in the 21st Century.

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#### Notes

- 1) This paper is partly based on the following two recent presentations: "Japanese Private Forestry and Its Regional Advancement" presented at International seminar on local knowledge and innovation: Enhancing the substance on non-metropolitan regions (Tottori, Japan. May, 1999), and "Reorganization of National Forest Management System and its Possible Effect for Regional Forestry Sector in Japan" presented at IUFRO Group 6.11.02 Averboden Conference: New opportunities for forest related rural development (Averboden, UK. August, 1999).

- 2) The estimated equation for wage in the period of 1956-75 by OLS is as follows:

$$\text{WAGE} = 85.84 \cdot \text{HINOKI} - 508.1$$

$$(t) \quad (19.006) \quad (-3.442)$$

$$R^2 = 0.953, \text{ Adjusted } R^2 = 0.950$$

Where WAGE is the wage of forestry workers in Yen per day, and HINOKI is law log price of Hinoki in thousand Yen per cubic meter.

- 3) The estimated equation for wage in the period of 1976-98 by OLS is as follows:

$$\text{WAGE} = -149.9 \cdot \text{HINOKI} + 19004.0$$

$$(t) \quad (-3.208) \quad (6.680)$$

$$R^2 = 0.329, \text{ Adjusted } R^2 = 0.297$$

Where WAGE is the wage of forestry workers in Yen per day, and HINOKI is law log price of Hinoki in thousand Yen per cubic meter.

This regression result is from a preliminary analysis, and further study is going to be followed.

- 4) Details of issue of introducing young forestry workers, please refer to the following papers. Ota, Ikuo (1997) Regennarating forestry workers in Japan. Proceedings of Symposium in Kyoko 1997, pp72 - 79., and Ota, Ikuo (1996) Expansion of business activities and measures of recruiting forestry workers in Ryujin Village Forestry Cooperative. Natural Resource Economic Review, Kyoto University: No.2, pp107-128 (in Japanese with English summary).
- 5) However, Forestry Agency is going to harvest timber from the "land and water" function forest, and total area of production forest including certain portion of "land and water" function forest and "sustainable use of forest resources" forest seems to be around 40 to 50% of National Forest (datail is not published). This means there would not be much real changes in forest use classification. New category of public benefit forest, which they designated 79% of National Forest, might be a kind of an exaggeration.